

CLAIMS:

1. An electric power steering system including a torque control system for generating a steering assist torque based on a detected steering torque,

the system further comprising a filter portion for improving a phase characteristic or a gain characteristic of the torque control system,

wherein the filter portion is constituted as a multiple-step filter including a first filter having a transfer function $G_1(s)$ for suppressing resonance and a second filter having a transfer function $G_2(s)$,

wherein the transfer function $G_1(s)$ is represented by the following expression (1-1),

$$G_1(s) = (s^2 + 2\zeta_{11}\omega_1 + \omega_1^2) / (s^2 + 2\zeta_{12}\omega_1 + \omega_1^2) \dots (1-1),$$

where s : a Laplace operator, ζ_{11} : a damping coefficient, ζ_{12} : a damping coefficient, and ω_1 : an angular frequency,

wherein the transfer function $G_2(s)$ is represented by the following expression (2-1),

$$G_2(s) = (s^2 + 2\zeta_{21}\omega_2 + \omega_2^2) / (s^2 + 2\zeta_{22}\omega_2 + \omega_2^2) \dots (2-1),$$

where s : a Laplace operator, ζ_{21} : a damping coefficient, ζ_{22} : a damping coefficient, and ω_2 : an angular frequency, and

wherein the damping coefficients ζ_{21} , ζ_{22} satisfy the following expression (2-2),

$$\zeta_{21} \geq \zeta_{22} \geq 1 \dots (2-2).$$

2. An electric power steering system according to Claim 1, wherein the angular frequencies ω_1 , ω_2 satisfy the following

expression (3),

$$\omega_1 = \omega_2 \dots (3).$$

3. An electric power steering system according to Claim 1, wherein the angular frequencies ω_1 , ω_2 satisfy the following expression (4),

$$\omega_1 \neq \omega_2 \dots (4).$$